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URGENT – REPLY TO FINAL OFFICE ACTION

REMARKS

The Office action of February 25, 2009, has been carefully considered and reconsideration of the amended application is earnestly solicited.

The amendments in the claims are intended to correct the weak points in the preambles and in claims 15, 17, and 19 kindly pointed out by the Examiner. The amended Claims 15 and 19 are believed to overcome the 35 U.S.C. 112 objection of the Office action.

As to the double patenting objection relating to claims of our copending application, **a Terminal Disclaimer is appended** following the "Remarks."

The amendment in claim 2 emphasizes the distinction between our "substantially full wetting" and whatever spotty wetting might be generated in Bentley's precipitator by whatever residual mist particles might reach it in the final cleanup stage.

The amendments in our basic claims 1 and 5 pinpoint the distinctions between our "wet electrostatic precipitation-based" apparatus and methods and **Bentley's systems**. The latter **are based primarily on the use of "baffled separators,"** with an optional appendage of an electrostatic precipitator in the one of their applications that is directed towards scrubbing or cleaning a dirty gas [Column 3, Lines 17-19] and not for ultra-sensitive detection of hazardous airborne constituents that may be lethal even in extremely low concentrations. It is like the difference between motor-driven and horse-driven carriages, both of which may have similar appurtenances, but one of which is propelled by a battery- or combustion-powered motor. The electrostatic precipitator of Bentley's Fig. 3, appended to the last stage of that figure, does not alter the basis of their system any more than a motor cycle contained in a horse-driven carriage for a special convenience of one of its passengers could convert that carriage into an automobile.

These distinctions are brought out further by our insertion of the wordings "wet electrostatic precipitation-based", in Line 1 of claims 1 and 5, "said collector tube and discharge electrode forming part of said chamber," in the 4th and 3rd lines from the end of claim 1, and "sampling means forming part of said containing means" in Lines 5 and 6 of claim 5. Other changes in claim 5 consist of rearranging and thereby correcting the logical order in which the method steps are listed.

To further demonstrate the inapplicability of the electrostatic precipitator of Bentley's Fig. 3 to our basic claims 1 and 5, we cite verbatim the following excerpts from the cited patent:

Column 3, Lines17-19:

"FIG. 3 is a diagram which depicts a **system in which a dirty gas is scrubbed**, or cleaned, **and the scrubbing liquid is recovered and reused**". Ergo, Fig. 3 does not pertain to the collection and detection of hazardous particles but rather to cleaning up a dirty gas.

Column 3, Lines 30-35:

"The gas then passes into a fourth reservoir and separation zones 54 which are similar to the second reservoir and separation zones 52. The gas then passes into an electrostatic precipitator where droplets of mist still remaining in the gas stream are substantially removed". **Ergo, what enters Bentley's precipitator is gas and mist from the 4th reservoir and zone 54.**

Column 3, Lines 46-48:

"This **liquid, which is partially contaminated by material removed from the gas in the fourth reservoir and separation zones 54,**" clearly **does not meet the requirement of our basic claims 1 and 5, Line 4, for "introducing an analyte-free collection liquid into said containing means".**

This should dispose of Points 1-7, Pages 2-3, of the Examiner's "Response to Arguments".

As to Points 8-11, Pages 4-5, attention is invited to the following arguments:

Re Point 8: Although the experimental work of Example 1, Paragraphs 0044-0054, had to be confined to 1 micron particles with our available instrumentation, the following excerpts from the specification emphasize the applicability of our invention to much smaller particles:

Paragraph 0008: "According to the latter references, **wet EP can achieve collection efficiencies of 99.9% for particles as small as 0.01 micron in size** and for various gaseous species, including dioxins/furans, **which could also assure capture of toxins and dry virus particles. The latter remain suspended in air long after evaporation of water from the droplets in which they were originally dispersed and may thus present a persistent not readily noticeable hazard. Therefore, an ability to collect dry virus particles should greatly enhance the effectiveness of biological agent detection systems.** "

Paragraph 0056: "The high airflow rates and collection efficiencies which are achievable with wet EP technology not only for particles 1-10 microns in size but also for submicron particles render the PHTLAAS-EP applicable to ultra-sensitive detection of not only cellular pathogens, such as anthrax or tuberculosis bacilli, but also of the much smaller toxins and dry virus particles. The latter may pose a serious hazard following vaporization of the droplets in which they were originally dispersed. The capability to collect toxins and dry virus particles will therefore greatly strengthen the arsenal for defense against biological warfare agents".

That the ability of wet EP instrument to efficiently collect submicron-size virus particles is not confined to "other electrostatic precipitators" is evidenced by a pioneering paper of Zaromb et al., in the **Proceedings of the 2007 SCIENTIFIC CONFERENCE ON OBSCURATION AND AEROSOL RESEARCH,** Battelle Eastern Science and Technology Center, Aberdeen, MD, 20 June 2007. For the Examiner's convenience, this paper is appended herewith following the Terminal Disclaimer.

Although electrostatic precipitators have been known to collect particles as small as 0.01 micron, their potential importance in the collection of virus and toxin particles has not been previously appreciated, which is why our claims 12-14 should be patentable.

URGENT – REPLY TO FINAL OFFICE ACTION

Re Point 9: As noted above, the mist reaching the electrostatic precipitator of Fig. 3 is bound to be "**partially contaminated.....from the gas in the fourth reservoir and separation zones 54**" [Column 3, Lines 46-48] through which it must first pass. Therefore, it could not meet the requirement of basic claims 1 and 5 and their subsidiary claims 2, 3, 6, and 7 for "**introducing an analyte-free collection liquid into said containing means**".

Re Point 10: According to Bentley's Column 3, Lines 33-35, "The gas then passes into an electrostatic precipitator where **droplets of mist still remaining in the gas stream are substantially removed**". The few remaining droplets are clearly neither intended nor sufficient to effectuate "substantially full wetting of the inner surface of said tube", as required by the amended claims 2 and 6. Moreover, since these few residual droplets would not suffice for Bentley's precipitator to function as a wet electrostatic precipitator, the latter would not meet the requirement of Line 1 of our amended claims 1 and 5.

Re Point 11: Bentley's Column 3, Lines 3-16, form part of the discussion of Figs. 1 and 2, neither of which show the precipitator of Fig. 3. The latter is not mentioned until Lines 17-65, which are addressed at gas cleaning or scrubbing and contain no word about a detection or analyzing means.

As to Points 12-15, Pages 5-6, Claim Objections or Rejections under 35 USC 112, these have been taken care of by the amendments in claims 17, 15, and 19.

As to the rejections based on 35 USC § 102, Pages 6-8 of the Office Action, these are based on an incorrect inclusion of the electrostatic precipitator of Bentley's Fig. 3 in their disclosures pertaining to Figs. 1 and 2. As was already noted, the cited **Bentley patent discloses two distinct embodiments based on the use of "baffled separators,"** the first of which is represented by its Fig. 1 and addressed to the monitoring of air contaminants, as in our claims, whereas the second embodiment represented by Fig. 3 is directed at "cleaning a gas" [see Abstract, penultimate sentence, or Column 1, Lines 66-68]. **Since our basic Claims 1 and 5 are restricted to "detecting the presence of an airborne chemical or biological analyte," the gas cleaning embodiment of Bentley's Fig. 3 does not apply to them. Neither does the electrostatic precipitator of Fig. 3, which is part of a final gas clean-up [Column 3, Lines 33-35] and is not included in Figs. 1 and 2 or in the discussion relating thereto.** Since that discussion pertains exclusively to baffled separators and does not even mention electrostatic precipitation, it can not have any bearing on our claims.

To summarize, Bentley's electrostatic precipitator is not relevant because it does not meet the following specifications of our amended basic claims 1 and 5:

a. "Wet electrostatic precipitation" requires "substantially full wetting of the inner surface" of the collector tube by a liquid film [see amended claim 2], which can not be achieved by a few residual mist droplets;

b. Not only does it not provide the required "means for introducing an analyte-free collection liquid", but its intake from the contaminated "**fourth reservoir and separation zones 54**" prevents that liquid from being analyte-free;

c. As an appendage to the last stage of Fig. 3, it does not form part of any "gas- and liquid-containing means" as specified in our amended claims 1 and 5; and

d. It forms part of a scrubbing or clean-up system, but not of any detection system that our claims are restricted to.

Since the disclosures pertaining to Bentley's Figs. 1 and 2 do not deal with an electrostatic precipitation system, whereas those of Fig. 3 are inapplicable for the above reasons, the objections to our basic Claims 1 and 5 based on 35 USC § 102 should be removed.

As to the rejection of our **Claims 2, 3, 6, and 7** based on Bentley's following sentence: "A mist created by a piezoelectric ultrasonic transducer is contacted with the gas and both gas and mist are passed through baffled separators" (Column 1, Lines 47-50), it must be noted that the sentence refers explicitly to "baffled separators" and not to any collector electrode tube and that the function of Bentley's mist is not to wet any inner walls but rather to react with or absorb solid and gaseous materials from the gas stream (Column 1, Lines 51-53). The argument that a residual portion of mist reaches the electrostatic precipitator of Bentley's Fig. 3 falls apart in view of our above demonstrations that the cited precipitator is irrelevant to our claims. The same applies to the objection to **Claim 9**. It is therefore respectfully submitted that the objections to these claims based on 35 USC § 102 appear to have been removed likewise.

As to the objection to **Claims 12-14**, we again find no mention of "an electrostatic precipitation-based aerosol collector" in Bentley's Summary of Invention or Column 1, Lines 23-36 or Column 2, Lines 10-17. The "piezoelectric ultrasonic transducer" found in these citations serves to generate mist particles but not to capture them. However, claim 12 has been further amended to start with the wording "A method of capturing for detection..." which again excludes from consideration the electrostatic precipitator of Bentley's patent. Objections based on the argument that electrostatic precipitators capture sub-micron-size particles would be valid for applications pertaining to air scrubbing, such as those of Bentley's Fig. 3, but not to capture for detection, which is a new application of such precipitators. It is to be noted that most existing aerosol collectors intended for monitoring of hazardous air contaminants can not capture sub-micron-size particles with the efficiency that is required for their ultra-sensitive detection. Any virus particles that they collect are mostly those which are attached to larger carriers, such as water droplets or dust particles, or are agglomerated into larger sizes. Since individual virus particles or their smaller agglomerates remain afloat in air for longer times and in larger numbers than the larger carriers or agglomerates, their efficient collection greatly enhances their detection sensitivity and thus opens the way to timely detection of hazardous viruses, such as those of

URGENT – REPLY TO FINAL OFFICE ACTION

pandemic influenza. The realization of the importance of such new detection capability constitutes a novel discovery which should qualify for patent protection.

It is therefore believed that the amended claims overcome the objections based on 35 USC § 102.

As to the rejections based on 35 USC § 103, it was noted above that Bentley's Fig. 1, which shows an analyzer 23 appropriate for air monitoring applications, does not include any electrostatic precipitator and no such precipitator is mentioned in its accompanying textual disclosure. It was also shown above, that the electrostatic precipitator of Bentley's Fig. 3 does not constitute any essential part of Bentley's baffle separation invention, but is merely a coincidental adjunct of a final clean-up step which could not in any reasonable way comprise "a gas- and liquid-containing chamber" and "means for introducing an analyte-free collection liquid into said chamber" as called for in our basic claims 1 and 5. This refutes all the arguments that Bentley et al. discloses or teaches the apparatus of Claim 1 or 5. Hence the rejections based on these arguments should be rescinded and **all the rejections based on 35 USC § 103 should be withdrawn.**

It is therefore requested that the amended claims be found to be allowable.

Respectfully submitted by,

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